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CUSTOMS UNIONS AND FOREIGN INVESTMENT: THEORY AND EVIDENCE FROM MERCOSUR'S AUTO INDUSTRY

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The World Bank and Emory Univesrity

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Resumen

Este artículo muestra cómo los acuerdos regionales de comercio (ARC) pueden generar una expansión de la inversión extranjera directa y efectos redistributivos. Estos dos efectos, a su vez, afectan la formación endógena de los ARC. La inversión aumenta a consecuencia de la capacidad de las firmas extranjeras de atender un mercado más grande desde una única instalación. El efecto de redistribución ocurre por el deseo de las firmas de trasladar sus plantas originales desde países de alto costo a otros más convenientes. La industria automotriz en el Mercosur es un excelente ejemplo para estudiar estos fenómenos. Argentina temía que Brasil —con bajos costos— atrajera toda la inversión extranjera y dominara ambos mercados. Para convencer a Argentina que aceptara firmar un tratado de libre comercio en automóviles (y con Mercosur), el acuerdo sectorial incluyó la una cláusula comercial compensatoria, que exige a cada firma equilibrar su comercio entre estos países. Así se mitigaría el problema de la redistribución, pues obliga a las firmas a producir algunos modelos en Argentina y alienta a los gobiernos a firmar el ARC.

Abstract

This paper demonstrates how regional trade agreements (RTAs) can lead to both foreign direct investment expansion and relocation effects. These two effects, in return, impact the endogenous formation of RTAs. The investment expansion effect results from foreign firms' ability to serve a larger market from a single facility. The relocation effect occurs due to the firms' desire to move their initial plants from high-cost member countries to low-cost ones. The relocation effect can overwhelm the expansion effect for the high-cost members and lead to the collapse of socially efficient RTAs. The auto industry in Mercosur is a great example to study these phenomena. Argentina was worried that low-cost Brazil would attract all of the foreign investment and dominate both markets. To convince Argentina to agree to free trade in automobiles (and to Mercosur), the auto sectoral agreement included the Compensated Trade Clause (CTC) which requires each firm to balance its trade between these countries. This mitigates the relocation problem by forcing firms to produce some models in Argentina and entices the governments to sign the RTA.

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1 Introduction

Academic debate over the effects of the proliferation of regional trade agreements (RTAs) has mostly focused on the trade diversion vs. trade creation question[1]. However, a close inspection of the actual formation process of various RTAs reveals that member countries are equally concerned about the impact on the investment flows. There is widespread evidence that smaller and poorer countries (such as Eastern European or Latin American countries) want to join wealthier groups (such as the EU or the NAFTA) or form regional unions (such as Mercosur) in order to attract more foreign direct investment. The main reason is that foreign firms are more likely to invest in a country that is a member of a RTA since they can serve a larger market from a single facility and save on the fixed costs of operating a plant. The *investment expansion* effect improves the welfare of the member countries as a whole and creates a significant motive to form RTAs. This is indeed among the main features of what Ethier [1998] identifies as "*New Regionalism*" and "*Deep Integration*" paradigms.

Formation or enlargement of RTAs, at the same time, can divert part of the initial foreign investment from some member countries to others. Foreign firms can relocate their regional production away from countries with high production costs and serve the integrated market from their plants in the low-cost countries. This *investment relocation* effect can be quite significant for the high-cost countries and leave them worse off under the RTA compared to a unilateral trade policy. Therefore cost asymmetries among member countries leave RTAs vulnerable to defection by high-cost countries and may cause their failure even when the net gain for the region is positive.

The auto industry in Mercosur is a great example to study the phenomena mentioned above. During Mercosur negotiations, Argentina was quite concerned that low-cost Brazil would attract all of the current auto producers[2] as well as new entrants who would find it profitable to invest in the region. The sectoral negotiations in automobiles involved numerous impasses over the years and had to be salvaged by the presidents of Argentina and Brazil on several occasions. The two governments resolved the investment relocation problem through an ingenious mechanism called "Compensated Trade Clause" (CTC)[3] and signed the final sectoral agreement called "Politica Automotriz del Mercosur" (Automotive Policy of Mercosur - PAM) on March 24, 2000. The CTC requires that

[1] See Baldwin and Venables [1995] for an excellent survey.

[2] The auto industry in both countries was composed of foreign firms and their affiliates before Mercosur. This continued to be the case after Mercosur.

[3] The CTC was included in the initial treaties (the Treaty of Asuncion in 1991 and Ouro Preto Protocol in 1994) that established Mercosur. PAM extended it until 2006. See next section for further details.

each auto company should balance its bilateral auto trade between Argentina and Brazil. If a firm fails to do so, its exports are subject to the regular tariff rates. A balanced trade requirement forces firms to invest and produce in both countries and prevents Brazil from dominating both markets at the expense of Argentina. In other words, it mitigates the relocation problem while maintaining the benefits from investment expansion. Without the CTC, Argentina would never have agreed to free trade in automobiles and probably would have abandoned Mercosur[4].

More interestingly, it was the auto companies who suggested and lobbied extensively for this restrictive rule. They would have naturally preferred to locate the production of all models and varieties in Brazil but they were still able to take advantage of economies of scale by concentrating all production of a model in one plant. Firms did exactly so by producing their luxury models in Argentina and basic models in Brazil. In short, firms were aware that Mercosur with the CTC was a better option than no Mercosur at all. It is also interesting to note that the CTC is enforced at the firm level. This prevents the free-rider problem that arises when each firm desires its competitors to invest in Argentina to save Mercosur for everyone's benefit. Thus the CTC not only helps the governments to agree to regional free trade in automobiles but also increases the firms' profitability.

In this paper, our aim is two-fold. First, we introduce the simultaneous presence foreign direct investment expansion and relocation effects of RTAs through a theoretical model and demonstrate how these two effects endogenously determine the incentives to sign RTAs. More specifically, we show that the relocation effect can overwhelm the expansion effect for high-cost countries and lead to the collapse of the RTA. Second, we show how the harmful relocation effect was mitigated by the CTC in Mercosur to realize the beneficial expansion effects.

Our theoretical model highlights the strategic interaction between governments and firms during RTA negotiations. The model has four stages. First, two governments negotiate a customs union (CU). If a CU is formed, then the firms decide on their investment levels, and which models to produce and where in the second stage. In the third stage, the two governments determine a common external tariff given the investment decisions of the firms. In the fourth and final stage, the firms compete in a Cournot fashion in every model category and the payoffs are realized. If the CU negotiations fail in the first stage, then the firms make their investment decisions knowing that there is going to be no intra-regional free trade. The governments choose their unilateral tariffs

[4]There are of course more efficient mechanisms, such as direct transfers, that would convince Argentina to sign the Mercosur. However these are politically difficult to negotiate and implement since they would require transfers between the auto firms, Brazil and Argentina. The compensated trade clause is attractive in terms of domestic politics since it is based on "fair trade", as the trade ministers of both countries remarked many times,

and then the production takes place.

Both governments maximize a welfare function that takes into account the welfare of their citizens and the number of cars produced within their borders (hence the incentive to attract foreign firms.) All things being equal, firms prefer a customs union to serve both countries from the same plants in order to take advantage of economies of scale (at the model level). We show that a customs union between symmetric countries leads to higher overall investment into the region in equilibrium because of this effect. Both countries benefit from this and therefore agree to the customs union. However, if one country has lower production costs for all models, all firms want to locate their plants there. We demonstrate that the other government never agrees to form a union since it is better off by imposing unilateral tariffs. The resulting collapse of the CU makes all firms worse off. Under such circumstances, firms support a balanced trade rule which requires them to produce some models at the high-cost country. This alleviates the investment relocation effect and convinces the high-cost country to stay in the customs union. Hence the economically inefficient CTC becomes a political and strategic mechanism that entices the governments to form a customs union by forcing the firms to invest in both countries.

Our political economy framework is in the same spirit of the "Quid Pro Quo" foreign investment behavior of Bhagwati et.al. [1987, 1992] and Dinopoulos [1989] since the foreign investment decisions are undertaken in anticipation of (and to influence) future government actions. They are also influenced by Grossman and Helpman's [1994,1995] political economy framework for endogenous policy determination where governments care about welfare and monetary contributions from lobby groups. Grossman and Helpman [1996] look at how tariffs are determined endogenously in a single country when there is the possibility of tariff-jumping foreign investment. We modify this framework so that governments care about the level of foreign investment and extend it to accommodate customs union negotiations.

There are several papers which directly look at the impact of RTAs on foreign direct investment flows. Motta and Norman [1996] is an original and innovative paper that models the effects of regional integration on investment flows in a three country, three firm setting with Cournot competition. They look at the changes in the investment strategies of these firms as two of the countries get more integrated. They find that regional integration (in most cases) increases the intra-region production of the outside firm through rationalization of production, as it is the case in our model. However, the investment relocation effect cannot arise in their model due to the symmetries. Furthermore, they do not model government behavior and, therefore, can not endogenize the customs

union formation and tariff determination process. In a related paper, Heinrich and Konan [2000] analyze the impact of regional trade agreements on foreign direct investment (FDI) patterns in a similar symmetric model. As do Motta and Norman [1996], they also show that integration leads to rationalization by foreign firms and higher levels of regional production. They endogenize the number of foreign firms that invest in the region and show that the impact of regional integration is ambiguous since rationalization and easier access have opposing effects. As with the previous paper, the investment relocation and endogeneity issues are absent from their model. Ethier [1998] emphasizes that small countries want to join regional blocs of developed countries to attract more foreign investment, not necessarily to increase their bilateral trade. Though his main focus is on the relationships between multilateralism and the "new regionalism," his evidence and arguments provide support for the motivation in our paper. There is a large literature on the impact of regional integration on firms' location decisions in the presence of agglomeration forces (such as technological externalities). These "new growth" type of issues are beyond the scope of this paper and are extensively surveyed in Baldwin and Venables [1995]. Finally, there are numerous papers on multinational firms (within the new trade theory literature) mainly associated with Markusen, Helpman and Ethier. Some of the main issues they analyze are strategic and technological issues in markets in the presence of multinational firms. These are again beyond our scope and Markusen [1995] provides a nice introduction to this voluminous literature.

There are numerous empirical studies looking at the linkage between regional integration and total foreign direct investment. Blomstrom and Kokko [1997] study three regional agreements and conclude that investment flows depend on the overall advantages of the region. Beaulieu and Hester [1999] find that regional agreements in Latin America indirectly increased FDI by lowering country-risk. However most of these studies use aggregate data and do not analyze the specific sectoral and institutional arrangements. The most relevant empirical study is Baldwin, Forslid and Haaland [1995] who analyze the investment expansion and relocation effects of the EU's Single Market Programme (EU92). Through empirical evidence and simulations, they show that EU92 caused capital to be diverted from the EFTA countries to the EU and argue that the EU92 initiative (partly due to the investment relocation) led several EFTA countries to join EU.

The next section analyzes the auto industry in Mercosur and the sectoral agrement. Section III provides the main features of the analytical framework. Sections IV presents the unilateral game between a government and the firms to determine the tariff rate and the investment levels. Section V introduces the customs union negotiations between symmetric countries and the invest-

ment expansion effect. Section VI presents the investment relocation effect when the countries are asymmetric and shows the significance of the CTC. Section VII concludes the paper and offers directions for further research.

2 Mercosur and The Auto Sector

Mercosur was formed with the signing of the Treaty of Asuncion on November 29, 1991 by Argentina, Brazil, Paraguay and Uruguay[5]. The customs union became effective on January 1, 1995 and the external tariffs converged progressively to an average rate of 14%[6]. Since then intra-bloc trade has quadrupled which significantly increased the share of Mercosur trade in member countries' total trade volume (Table 1). Foreign Direct Investment has shown explosive growth during the same period in Argentina and Brazil, with a substantial portion of these investments targeted towards industries that benefit from intra-bloc trade (see ECLAC [1998, 2000].)

Opinions on Mercosur's impact are mixed. Yeats [1996] finds that intra-bloc trade has most flourished in those sectors with the highest protection (industrialized products) and the least revealed comparative advantage. Olarreaga and Soloaga [1998] analyze the endogenous formation of tariffs in Mercosur and show that Argentina and Brazil have the highest deviation from common external tariffs and free internal trade in products for which they have high levels of protection.

The auto and sugar industries are the only sectors that have a unified sectoral agreement with widespread exemptions from internal free trade and common external policies allowed by the GATT. Argentina and Brazil are, for all practical purposes, the only countries that manufacture automobiles in Mercosur[7]. Before Mercosur, both countries extended generous subsidies and granted high protection to their respective industries with a mix of quotas and high tariffs as a part of their import substitution schemes[8]. The majority of the companies were joint ventures of foreign multinationals with domestic firms[9]. Prior to the signing of the Asuncion Treaty, the Argentine auto industry

[5] Bolivia and Chile became "associate members" in 1996. Full members form a custom union whereas the associate members have a free trade agreement.

[6] Olarreaga and Soloaga [1998] analyze the stylized facts of the sectors being exempted. For in depth analysis of trade liberalization in Argentina and Brazil see Cavallo and Cottani [1991] and Coes [1991].

[7] For an in-depth review of the Argentine automobile industry, see Nofal [1989]. Brazil's history is well summarized in Arbix and Rodrigues [1998].

[8] One of the arguments in favor of protectionism was to ease the balance of payments problems. For example, in 1995, Brazil imposed a unilateral quota on imported cars to ease the effects of the Tequila crisis.

[9] Ford, Volkswagen, Fiat and General Motors were the main auto manufacturers in Brazil while Ford, Volkswagen,

was in a severe crisis, with production at historically low levels of 100,000 units in 1990 (Table 2). Mercosur led to a remarkable turnaround and the industry quadrupled its production to 409,000 units in 1994 and to 435,000 units in 1998. The Brazilian auto industry also showed solid growth, roughly doubling its production during the decade (Table 2).

The signing of Mercosur had a big impact on the export levels of the Argentine auto industry (Table 2). Before the signing of the Treaty of Asuncion, exports constituted 1% of total production. Eight years later, in 1998, Argentina exported 237,497 units, accounting for 55% of production. Brazil, on the other hand, doubled its production while the exports to production ratio stayed the same.

The intra-industry trade between the two countries reveals even more impressive numbers. Argentine auto exports rose from only $53 million to $2.6 billion in eight years (Table 3). Around 90% of this volume is headed for Brazil and it is around 30% of total merchandise exports to Brazil (from 4% in 1990). In 1998, auto exports to Brazil accounted for almost 50% of total production in Argentina from 3% in 1991 (Table 3). Brazilian exports to Argentina increased from $60 million in 1990 to $2.0 billion in 1998 which is also around 30% of total exports (Table 4). Brazilian export markets are relatively more diversified, with Argentina accounting for around 50% of total exports and 14% of total production (Table 4). However, there has not been a significant increase in the total export volume and export/production ratio in Brazil. This implies that Brazilian manufacturers switched to exporting to Argentina in lieu of other countries.

We have mentioned above that the auto industry receives the largest amount of FDI in the trade bloc (CEI 1998). Table 5 shows the investment patterns for both countries. There is a tremendous increase in investment in Brazil in particular. Argentina has also received remarkable investment flows, rivaled only by the food industry.

When two countries sign an RTA for an industry characterized by economies of scale and product variety, trade gets diverted from third countries to the regional partner. Each country specializes in certain varieties and imports the others as in Helpman and Krugman [1986]. However this outcome requires symmetry between the two countries in many respects (especially in a partial-equilibrium setting). In reality, Brazil enjoys larger economies of scale, lower labor, raw materials and transportation costs and is therefore likely to produce all of the automobiles. This implies no further production is expected to take place in Argentina after Mercosur, let alone production and export booms as we actually observed. The sectoral agreement in automobiles and the CTC

Fiat,Renault and Peugeot were operating in Argentina. See Kosacoff [1999] for more details.

explain why Argentine auto industry was revitalized after Mercosur, why the intra-industry trade grew so rapidly and why foreign firms invested so intensively in Argentina.

2.1 The Sectoral Agreement

GATT rules permit the exclusion of certain sectors from being liberalized under a preferential trade agreement for a "reasonable period of time". Protocol 21 of the Treaty of Asuncion provides for the exclusion of auto and sugar sectors from free intra-bloc trade. One of the most important points of Protocol 21 was the establishment of the so-called "compensated trade clause (CTC)." It allows foreign firms that have plants in both countries to trade automobiles tariff free, as long as the trade between the two plants is "compensated." More specifically, a firm is allowed to export US$1 from Brazil to Argentina, as long as it exports US$1.2 from its Argentine subsidiary to Brazil[10]. Otherwise, regular tariffs have to be paid. The Ouro Preto Protocol, signed in December of 1994 on the eve of the inauguration of the Customs Union, modified Protocol 21 by eliminating certain quotas but kept the CTC in effect. Finally, the Ouro Preto Protocol called for the implementation of a final auto agreement that would be in effect on January 1, 2000. The Ouro Preto Protocol was followed by a frenzy of investment announcements in both countries. A careful review of the announcements and investment decisions show that the firms were investing in both countries by generally building the more expensive models in Argentina.

The views expressed by people involved in the process reflect the importance of the CTC. The former president of Ford Argentina stated in a newspaper in 1995: "This is not about trade, it is about investments." The Industry Secretary of Argentina at the time, Alieto Guadagni, went as far as to say: "Without the Automobile Agreement, the Argentine car industry will disappear."

The main lobby groups representing the auto manufacturers are ADEFA[11] in Argentina and ANFAVEA[12] in Brazil. They have almost the same member firms whose representatives sit on the boards of directors of both lobby groups. This fact provided the conduit through which firms could lobby both the Argentine and Brazilian governments more effectively. In fact, the two lobby groups made a joint proposal to the national governments for the final car agreement in June 1999. The Ouro Preto Protocol had called for a final agreement between the two nations to be reached

[10] Additionally, Protocol 21 imposed trade quotas of 18,000 units in 1991, 25,000 units in 1992 and 1993, and 40,000 units in 1994.

[11] ADEFA= Asociacion de Fabricantes de Automotores. This is the Argentine auto industry lobby group.

[12] ANFAVEA is the Brazilian auto industry lobby group.

before the new millennium. The agreement between ADEFA and ANFAVEA gave Argentina the assurance that the Brazilians would still agree to the compensated trade clause.

The final document that kept the CTC in effect until 2006 was signed on March 24, 2000. The main reason for choosing this expiration date is the WTO rules which only allows a transitory period for sectoral exceptions to the free trade between customs unions members. The governments officials from both countries and the representatives from lobby groups spent considerable time and effort in Geneva to convince the WTO members not to file complaints against the new auto agreement in Mercosur[13]. The most salient points of "Politica Automotriz del Mercosur"[14](PAM) are as follows:

1. The compensation scheme is maintained with slight modifications. Firms are able to deviate from the compensated trade requirement by 6.2% in 2000, 10.5% in 2001, 16.2% in 2002 and 22.2% in 2003. The "Automobile Commission" will revise the rules for the last three years of the accord. Free trade between countries is set to start on January 1, 2006.

2. The "Automobile Commission" is formed to enforce the agreement. It is composed of members from the auto industry and the governments. Its most important functions are to regulate the compensation mechanisms of the accord. Specifically, it determines if the compensation mechanism and the CTC are still necessary in the last three years of the accord.

3. A punishment mechanism is established for firms that deviate from the compensated trade clause. For finished cars, the fine is 70% of the external tariffs and for auto-parts is 75% of tariffs.

4. The Common External Tariff (CET) is to progressively increase to 35% in 2005 for finished cars, the maximum permissible under WTO rules. This implies an increase in the tariff rates for Argentina, currently set in a range from 18% to 25%.

The PAM is not very different from the pre-accord signed by ADEFA and ANFAVEA in 1999. Representatives of the Argentine auto industry and the government were very satisfied, as reflected by the comments made by several of the interested parties. Luis Ureta Sanchez, president of ADEFA and Peugeot-Citroen of Argentina stated that "the accord is very similar to the one reached by

[13] Auto companies would naturally liked to have the PAM extended longer than 2006 but were happy to receive this protection. As one of the auto lobby executives remarked, "who knows what will happen in 6 years? Maybe we will be in NAFTA." (New York Times, Nov.23, 3000)

[14] Mercosur 's Automobile Policy

ADEFA, ANFAVEA and the labor unions of Argentina and Brazil. Moreover, the six years of duration is an excellent time frame to plan investment decisions," (La Nacion 3/25/00). Similarly, Enrique Federico, spokesperson of Mercedes-Benz Argentina, emphasizes the importance of the auto industry for the future of Mercosur stating that "the compensated trade clause favors the realization of investments in our country, since it permits the attenuation of variations in the markets of the two countries. It guarantees local production of automobiles and the continuation of our investments in the country."(La Nacion 3/25/00 and Clarin 3/25/00)

All of the evidence indicates the economic and political importance of the auto sector for the survival of Mercosur. The auto lobby groups and the two governments created an ingenious institution in the form of the CTC to prevent all of the auto manufacturing and the foreign investment from migrating to Brazil under a free trade regime.

In the next sections, we present an analytical model that incorporates and analyzes the above issues in more detail. The aim is to show the strategic problems that arise under a customs union between asymmetric countries due to the significance of the investment relocation effects. Then, the seemingly inefficient CTC becomes an optimal mechanism to prevent the failure of socially efficient customs union agreements.

3 The Analytical Framework

3.1 Introduction

We use a game theoretic framework influenced by the Quid Pro Quo and political economy literature. The basic structure of this family of models is a simple two-stage perfect information game played between interest groups and one government. In the first stage, interest groups take an action (such as offering campaign contributions to the government) to influence the actions of the government. In the second stage, the government chooses a policy variable (generally a tariff) to maximize a "political" objective function, given the actions of the interest groups in the first stage. These models establish an explicit dependence between the behavior of domestic firms and the degree of protection imposed by the government. In this paper, we use the investment decisions of the foreign firms as strategic variables that influence the policy choices of the governments in the second stage.

We present three separate games that are of increasing complexity. The first game is a simple

two-stage game between foreign firms and one government to determine tariffs and investment levels. It provides us the reservation payoffs used in subsequent games. In the first stage, the firms decide whether to produce in the foreign country and import to A or invest in A and produce locally. In the second stage, the government of country A sets a tariff t depending on the investment decisions of the firms to maximize its objective function. Then production takes place and payoffs are realized.

The second game is played between foreign firms and the governments of two *symmetric* countries forming a Customs Union. In the first stage, the governments meet to form a customs union. In the second stage, foreign firms decide to produce in country A, country B or to import from their own country. In the third stage, the two governments impose a common external tariff taking the investment decisions as given. If a customs union is not formed in the first stage, the two governments play their individual games with the firms as in the first game. Finally, production and trade in the respective countries take place and payoffs are realized.

The third game is identical to the second game except that the countries are not symmetric. More specifically, country B has a cost advantage in production over country A. In this case we show that equilibrium outcome is quite different from the one obtained in the second game.

3.2 Basic Model

There are three economic agents in this model: consumers, firms and governments. We begin by considering two countries: country A and the foreign country f where the auto companies and their plants are located (for example, the United States). The auto market in country A is composed of M categories (such as minivans and compact cars) and there are N auto manufacturers who produce one brand in each category. Brands in a given category are perfect substitutes and the firms are identical in every respect.

Firms face two types of costs when producing their brand in a given category: the fixed cost of operating a plant (denoted by F) in country A and variable cost of production. F includes managerial and overhead costs at the plant level and does not include capital expenditure. The variable cost arises from the following production technology for each category regardless of production location:

$$x = g(K, L) = \delta K^{\alpha} L^{1-\alpha}$$

where x is the output, δ is a technology parameter K is the capital and L is the effective labor

employed. Assume r is the rental rate of capital which is same for the firms regardless of location while the wage rate w is country specific. This leads to the total cost function that is linear in output, decreasing in δ and increasing in r and w:

$$TC(x) = x\frac{r^{\alpha}w^{1-\alpha}}{\delta}\Delta + F$$

where Δ is a function of α. Thus the marginal cost of production is constant and includes labor and capital costs. A firm decides whether to produce in the foreign country at marginal cost c^f or in country A at marginal cost c^A. We assume that the marginal cost of a unit in the foreign country is lower than producing the same unit in country A for all firms so that $c^A > c^f$. Higher effective wages in A or different technology parameters (due to different infrastructure) might cause this[15]. All firms already have plants operating in the foreign country and the only relevant fixed cost is the one to operate a plant in country A. This implies that under free trade, we do not see any investment and production by foreign firms in country A since it is cheaper to import from the foreign country. Furthermore the capital employed is also a linear function of output: $K = x(\beta/\delta)(w/r)^{1-\alpha}$. Therefore any policy that increases the production in A increases foreign direct investment. For the rest of the paper, we use the phrases investment and local production interchangeably.

The firms face the following linear market demand function in each category m[16]:

$$D(p) = a - p \tag{1}$$

We assume that the N firms in a given category engage in Cournot competition. For the moment assume that k^A of these firms have plants in country A and the rest import the autos produced in the plants located in the foreign country. Then the equilibrium quantity produced by a firm operating from a local plant is

$$x^A = \frac{a - \left[N - k^A + 1\right]c^A + \left[N - k^A\right]\left[c^f + t\right]}{N+1}$$

where t is the tariff imposed by the government A on the imported units. Similarly, each firm that decides to import its automobiles produces the following in equilibrium:

$$x^f = \frac{a - \left[k^A + 1\right]\left[c^f + t\right] + k^A c^A}{N+1}$$

[15]None of the results in this section and the rest of the paper require the assumption $c^A > c^f$ which is adopted for simplicity. As it becomes more clear in the next section, government A uses the trade policy to encourage local production by foreign firms. As long as the equilibrium number of firms investing and local production levels are higher than their free-trade equivalents, our results hold. A high enough F for *some* firms guarantees this condition.

[16]We assume that the utility a consumer derives from consumption in one category is independent of the utility derived from another category. This assumption simplifies the analysis although the result do not depend on it.

The total quantity consumed is

$$X = k^A x^A + \left[N - k^A\right] x^f = \frac{Na - k^A c^A - \left[N - k^A\right]\left[c^f + t\right]}{N+1}$$

The profit levels (ignoring the fixed operational costs) for each firm from their operations in the category also depend on where their plants are located:

$$\begin{aligned} \pi^A &= \left[x^A\right]^2 \\ \pi^f &= \left[x^f\right]^2 \end{aligned}$$

Finally, the representative consumer obtains the following surplus from a given consumption level:

$$CS\left(X\right) = \frac{1}{2}\left(X\right)^2 \tag{2}$$

The government's only policy tool is the tariff rate. It chooses the tariff rate to maximize the following objective function:

$$G\left(t;k\right) = \left[CS\left(X\right) + t\left[N-k\right]x^f + \Phi k x^A\right] \tag{3}$$

The first term of (3) is simply the consumer surplus in the category as in equation (2). The second term is the tariff revenue collected on the imported volume when $N-k$ firms supply the domestic market from their plants in the foreign country. The last term is the domestic production by k firms in the category weighted by parameter Φ which is simply how much the government values domestic production. The inclusion of the third term is justified by, among other factors, the employment that production generates and the capital that is brought to a country since FDI is proportional to the output. It also represents political economy motivations to please powerful labor unions who greatly benefit from increased manufacturing activity. A higher tariff rate has two positive effects on this term: it increases the consumption of products manufactured at home and induces foreign firms to produce more brands at home.

4 Game 1 - Single Country

We are ready to consider the first game between N auto companies and a single country. It is a two-stage perfect information game where the firms face a choice between producing in the foreign country or in country A in the first stage. We assume that all firms announce their investment and location decisions simultaneously. They face a marginal cost per variety equal to c^f and a tariff

t (to be determined in the second stage) if they produce in the foreign country. They can also produce in country A at a cost of c^A and pay no tariff. In the second stage, the government of country A maximizes its welfare function and determines t. We use backward induction to solve for the sub-game perfect Nash equilibrium. The optimal tariff rate t that maximizes (3) as a function of k^A is

$$t^A = \frac{a - \left[Nk^A + 2k^A + 1\right] c^f + \left[Nk^A + 2k^A\right] c^A + \left[Nk^A + k^A\right] \Phi}{2Nk^A + N + 3k^A + 2} \tag{4}$$

The optimal tariff t^A is increasing in Φ, the weight attached to domestic production and decreasing in k^A, the number of firms which decide to invest[17].

Firms decide to invest in A if the increase in profits cover the fixed cost F. If $k^A - 1$ firms invest in country A, then the necessary condition for the k^{th} firm to also invest is that the change in the profit level has to cover the fixed cost F:

$$\pi^A\left(k^A\right) - \pi^f\left(k^A - 1\right) > F \tag{5}$$

The profit difference on the left hand side is decreasing in k^A which means the marginal benefit from investing in A decreases as more firms invest there. The equilibrium number of firms investing in A depends on the exogenous demand and supply parameters.

When $k^A = 0$, the optimal tariff chosen by the government is given by $t_0 = \left[a - c^f\right] / \left[N + 2\right]$ by expression (4). If $t_0 < c^A - c^f$, there is no investment and local production by any firm since condition (5) does not hold for any k^A and for any value of F. On the other hand, if $t_0 > c^A - c^f$, then the first firm might be able to increase its (variable) profits by investing in country A. Of course, the actual condition for investment is $\pi^A(1) - \pi^f(0) > F$. If this fails to hold, then there is also no investment by any firm. If it is satisfied, then the first firm invests. The second firm has less incentive to invest since the profit difference decreases with k^A. If $\pi^A(N) - \pi^f(N-1) > F$, then all firms invest in A. If we treat k^A as a continuous, rather than a discrete variable, the equilibrium number of firms investing k_1^A is implicitly given by

$$\pi^A\left(k_1^A\right) - \pi^f\left(k_1^A - 1\right) = F$$

In the following section, we use this equation to implicitly define the equilibrium number of firms investing in A and assume that there is an interior solution.

In the model we assume that the firms announce their investment decisions simultaneously. If k^A (where $k^A < k_1^A$) firms invest, then this can not be a Nash Equilibrium since one of the non-investing firms can improve its payoff by changing its decision. Similarly, one of the investing firms

[17] This condition holds for all values of k if Φ is large enough.

can improve its payoff if $k^A > k_1^A$ by shutting down its plant in A. A sequential announcement of investment decisions or a dynamic adjustment process (in which a new firms invests as long as it is optimal to do so) leads to the same outcome. Thus, we summarize the equilibrium investment level:

$$\begin{array}{c} \text{If } t^A\left(k^A=0\right)=\frac{\left[a-c^f\right]}{[N+2]}<c^A-c^f, \text{ then } k_1^A=0 \\ \text{If } \frac{\left[a-c^f\right]}{[N+2]}>c^A-c^f, \text{ then } k_1^A=\underset{0<k<N}{\max}\pi^A\left(k^A\right)-\pi^f\left(k^A-1\right)\geq F \end{array} \tag{6}$$

We have previously stated that there are M categories in auto market. Suppose we rank the categories according to the cost differential where $c_m^A - c_m^f$ is increasing in m. The subscript m can be a measure of the luxury level of the category and the ranking implies that the extra cost of producing a car in A increases with the luxury level. Then $k^A(m)$, the number of foreign companies investing in A, is decreasing in m. In other words, there are fewer companies operating plants in country A and more companies prefer to import from the foreign country as the automobiles become more luxurious and the foreign country has a larger cost advantage. Also, in equilibrium, there are more firms investing in categories with low cost differentials ($c_m^A - c_m^f$) in country A. Furthermore, the equilibrium tariffs are increasing in the cost differential (for a given level of k^A) and in the level of investment k^A (for a given cost differential $c_m^A - c_m^f$) which implies that the tariffs are increasing in the category index m. That is, the tariff rate is higher for more luxurious models as a result of these two effects.

5 Game 2 - Customs Union Negotiations Between Symmetric Countries

We now introduce the scenario which is relevant for the analysis of the Mercosur negotiations. Our aim is to show how the game between a government and the foreign firms changes when the government is also involved in customs union negotiations with a second country. More specifically, the decision to form a customs union depends on its impact on the investment decisions of the firms.

In this game, we again have N identical firms as in the previous game and two symmetric countries, A and B. We add a new initial stage in which the two governments decide whether to form a customs union or not. The political costs of forming a customs union dictate that it cannot be dissolved once formed. If a customs union is formed, all firms simultaneously announce their plant location decisions (in A, B or f) in the second stage. After observing the decisions of the

firms, the two governments negotiate a common external tariff t^{CU} in the third stage. Then, the production takes place and payoffs are realized.

If the two governments do not form a customs union in the first stage, we end up with two separate single country games as in the previous section. Firms decide on their plant locations and then the governments impose the unilaterally optimal tariffs (denoted t^A and t^B) as given by expression (4).

The formation of the customs union has an important impact on the production and investment decisions of the firms. We again assume that the firms already have plants in country f which do not need additional expenditure whereas the plants in A or B require an identical fixed operational cost of F. The marginal cost of production is lower in f compared to A or B (which we assume are identical in this section) so that $c^A = c^B > c^f$. The firms benefit strongly from the customs union agreement (assuming the tariffs stayed the same) since they can supply the markets of both countries from one plant and do not have to replicate the fixed cost F. If a customs union is not established, all the imports of A come from f since B has higher production costs and the same tariff rate is imposed on the imported goods regardless of production location.

We use backward induction starting with the last stage to find the equilibrium of this game. Suppose there are k_2^A (k_2^B) plants in country A (B) and let x^A (x^B) denote the production of a plant located in A (B) that is consumed in A while x^f represents the imported car sales in one country. These are given by the following:

$$\begin{aligned} x^A &= \frac{a - [N+1]\, c^A + k_2^A c^A + k_2^B c^B + \left[N - k_2^A - k_2^B\right]\left[c^f + t\right]}{N+1} \\ x^B &= \frac{a - [N+1]\, c^B + k_2^A c^A + k_2^B c^B + \left[N - k_2^A - k_2^B\right]\left[c^f + t\right]}{N+1} \\ x^f &= \frac{a - [N+1]\left[c^f + t\right] + k_2^A c^A + k_2^B c^B + \left[N - k_2^A - k_2^B\right]\left[c^f + t\right]}{N+1} \end{aligned}$$

The total consumption in A is

$$X^A = \frac{Na - k_2^A c^A - k_2^B c^B - \left[N - k_2^A - k_2^B\right]\left[c^f + t\right]}{N+1}$$

The individual payoff function for government A is

$$U^A\left(t^{CU}; k_2^A, k_2^B\right) = CS\left(X^A\right) + t^{CU}\left[N - k_2^A - k_2^B\right] x^f + 2\Phi k_2^A x^A \tag{7}$$

The first expression is the consumer surplus, the second expression is the tariff collected on the imports consumed in A and the third expression is the total production from the plants in A for

consumption in both countries[18]. The payoff function for B is similarly defined. We assume that the common external tariff is given by the solution to the following Nash bargaining game:

$$t^{CU} = \arg\max \left[U^A\left(t; k_2^A, k_2^B\right)\right]^{1/2} \left[U^B\left(t; k_2^A, k_2^B\right)\right]^{1/2} \tag{8}$$

This tariff rate is efficient in the sense that there are no further Pareto gains possible[19]. The first order condition from this expression provides the equilibrium for the Nash bargaining game. Before solving the optimum tariff explicitly, we make several observations. A simple comparative static exercise reveals that the common external tariff rate is increasing as a given number of plants are distributed more unequally between the two countries which can be expressed as $\left|k_2^A - k_2^B\right|$.

The firms decide whether to invest or not and where to locate their plants. The decision to invest is made if the increase in profits compensates for the operational fixed cost. Since the firms can serve two markets with one plant, the appropriate measure is the total profit from the region. The equilibrium numbers of plants in both countries are implicitly given by

$$2\left[\pi^A\left(k_2^A, k_2^B\right) - \pi^f\left(k_2^A, k_2^B\right)\right] = F \tag{9}$$

In equilibrium, all firms earn the same level of net profits. It is $2\pi^A\left(k_2^A, k_2^B\right) - F$ (or $2\pi^B\left(k_2^A, k_2^B\right) - F$) if a firm invests and $2\pi^f\left(k_2^A, k_2^B\right)$ if it does not. Another comparative statics exercise states that $\pi^f\left(k_2^A, k_2^B\right)$ is decreasing in t^{CU}. Since the tariff rate is declining in the disparity between the number of plants in two countries (given by $\left|k_2^A - k_2^B\right|$), the lowest tariff rate (for a fixed $k_c^A + k_c^B$) and the highest payoffs for firms are reached when $k_2^A = k_2^B$. If we have $k_2^A < k_2^B$, then firms have the incentive to relocate their plants from B to A since it leads to lower tariffs and higher payoffs. Thus, in equilibrium, we see equal levels of investment in both countries. This observation enables us to easily calculate the equilibrium common external tariff:

$$t^{CU} = \frac{a - \left[Nk_2 + 2k_2 + 1\right]c^f + \left[Nk_2 + 2k_2\right]c^A + \left[Nk_2 + k_2\right]\Phi}{2Nk_2 + N + 3k_2 + 2}$$

This is the identical tariff function we obtained in the previous section where $k_2 = k_2^A + k_2^B$ is the total number of plants in A and B. Therefore the customs union implements the same tariff rate as the individual countries if the number of plants serving a market is the same.

[18] Since the countries are identical, the demand for a given company's plant is also identical in both countries regardless of where the plant is located. So the total production of a plant located in A is $2x^A$.

[19] It is important to note that we assume that there are no direct transfers possible between the two governments. The presence of transfers has strong implications, especially in the next section of the paper.

The next issue is the equilibrium number of firms operating plants in the customs union area. This is given by expression (9) which is modified to $2\left[\pi^A\left(k_2 = k_2^A + k_2^B\right) - \pi^f\left(k_2 = k_2^A + k_2^B\right)\right] = F$. Since $\pi^A(k_2) - \pi^f(k_2)$ is declining in k_2, we have $k_2 > k_1^A$.

The customs union agreement is successfully signed in stage 1 if governments know that the final payoff for both countries is higher than their unilateral payoffs:

$$U^A\left(t^{CU}; k_2^A, k_2^B\right) \geq G^A\left(t^A; k_1^A\right) \text{ and } U^B\left(t^{CU}; k_2^A, k_2^B\right) \geq G^B\left(t^B; k_1^B\right) \tag{10}$$

Again, a simple comparative statics exercise shows that both governments are better off under the customs union. The consumer surplus increases since the prices go down. The effect on the total tariff revenue is ambiguous but the increase in consumer surplus more than compensates the loss. Finally, the payoff from domestic production increases since more firms invest in the region and produce at higher levels.

We now summarize the results of this section:

Summary 1 *When two symmetric countries form a customs union, (i) more firms invest in the region $k_2 > k_1^A = k_1^B$, (ii) the investments are equally divided between the two countries $k_2^A = k_2^B$, (iii) total capital invested and production in the region increases, and (iv) the equilibrium tariff rate increases $t^{CU} > t^A$ compared to the outcome of a unilateral game.*

It is important to recognize the strategic linkages between the investment (and domestic production) decisions and the customs union negotiations. Among the strongest supporters of a trade agreement are the potential export sectors since their production levels and profits increase. Furthermore, trade liberalization between two countries and an increase in the external tariff rate lead to higher regional production because each firms can serve a larger market from a single plant. Since the capital employed is proportional to the output, increase in the production level causes an increase in the FDI into the region. It is important to emphasize that this *investment expansion* effect refers to the increase in the capital employed by foreign firms to maintain higher production levels, not necessarily to the number of plants in operation in a country[20], (although this also occurs in equilibrium.) It also does not refer to the level of fixed operating costs F incurred by firms.

The desire to attract more foreign capital and production into the region provides one of the strongest motives for the formation of regional trade agreements in recent years. As Argentina's

[20] Government A would naturally prefer a single plant producing 100,000 units to two plants producing 10,000 units each. The former requires higher level of FDI and employs more workers.

Secretary of Industry had declared, the long and tedious negotiations about automobiles were not about the trade, but about foreign investments in auto production.

This is almost exactly what happened in Mercosur. There was barely any trade in automobiles between Argentina and Brazil before Mercosur since their products faced the same external tariffs as the products from other countries without any favorable treatment. All imports into either country came from lower cost and higher quality producers such as Europe and the United States. The formation of Mercosur changed the landscape since intra-Mercosur products receive positive discrimination compared to third countries' products. The result was a trade boom between the countries, which jumped to a total of US$4.7 billion in 1998 from only US$110 million in 1990. Also, the investment levels of foreign companies increased considerably after Mercosur. In Argentina, Fiat and Renault bought out their domestic partners and enlarged their production capacities. Ford and Volkswagen ended their partnership to establish their own operations. Chrysler, GM, Toyota announced that they are going to enter the market. In Brazil, the existing firms, Volkswagen, Fiat, Ford and GM increased their production capacities while Renault and several Japanese companies announced new investments. During the last five years more than 30% of total foreign investment into Mercosur was for auto production which fueled the rapid increase in the production levels.

6 Game 3 - Asymmetric Countries

The strategic interaction between the foreign firms and the two governments does not fully capture the trade and investment environment in the auto industry of Mercosur in one important respect: the production cost asymmetry between Argentina and Brazil. In this section, we modify the game to incorporate this asymmetry and to analyze its economic and strategic significance. More specifically, we assume that $c^A > c^B$ rather than $c^A = c^B$. This seemingly innocuous change has important implications on the equilibrium outcome although everything else with respect to market structure, fixed costs and the timing of the events stays the same as before. First, the two governments negotiate to form an irreversible customs union. If an agreement is reached, the firms decide to invest and where to locate their plants. Next the governments play a Nash bargaining game to determine the common external tariff rate. Finally, the production takes place and payoffs are realized. If the two governments cannot agree on a customs union, each government plays the unilateral game independently with the firms. We again solve the game starting from the last stage:

We let k_3^A and k_3^B denote the number of plants in A and B respectively announced in stage 2.

Then the sales level of a representative firm in a single country (A or B) if its plant is in A is given by

$$x^A = \frac{a - [N+1]\, c^A + k_3^A c^A + k_3^B c^B + \left[N - k_3^A - k_3^B\right]\left[c^f + t\right]}{N+1}$$

while the single-country sales if the plant is in B is equal to

$$x^B = \frac{a - [N+1]\, c^B + k_3^A c^A + k_3^B c^B + \left[N - k_3^A - k_3^B\right]\left[c^f + t\right]}{N+1}$$

Similarly, the imports in a single country of a representative firm is

$$x^f = \frac{a - [N+1]\left[c^f + t\right] + k_3^A c^A + k_3^B c^B + \left[N - k_3^A - k_3^B\right]\left[c^f + t\right]}{N+1}$$

The equilibrium common external tariff rate is again given by the solution of the Nash bargaining game played between the two governments:

$$t^{CU} = \arg\max \left[U^A\left(t; k_3^A, k_3^B\right)\right]^{1/2}\left[U^B\left(t; k_3^A, k_3^B\right)\right]^{1/2}$$

U^A and U^B are the objective function defined in (7). The firms base their investment decisions on their potential impact on the tariff level and the profit levels from the two markets. Both the tariff rate and the profit levels depend on the plant location:

$$\pi^A = \left[x^A\left(k_3^A, k_3^B\right)\right]^2, \pi^B = \left[x^B\left(k_3^A, k_3^B\right)\right]^2, \pi^f = \left[x^f\left(k_3^A, k_3^B\right)\right]^2$$

We observe that $\pi^A < \pi^B$ for all levels of t if $\left(c^A - c^B\right)$ is large enough. In the previous section, the tariff rate increased with the difference between k^A and k^B in the presence of symmetric costs. Since the profit level is decreasing in the tariff rate, the firms choose to allocate their locations equally between the two countries. However, the direct effect of production cost savings dominates this indirect effect when the cost difference $\left(c^A - c^B\right)$ is large enough. Therefore, once the customs union is formed, all firms locate their plants in B in order to take advantage of lower production costs and serve both markets from this plant[21]. The profit difference between investing and not investing in B again determines the equilibrium number of firms opening plants in B:

$$2\left[\pi^B\left(k_3^B\right) - \pi^f\left(k_3^B\right)\right] = F$$

We eliminated k_3^A from this equation since it is equal to zero in equilibrium. More foreign firms invest once the customs union is established so that $k_3^B > k_1^B$. Furthermore, the total production within the customs union increases so $k_3^B x_3^B > k_1^A x_1^A + k_1^B x_1^B$. This is the investment expansion

[21] See Corden (1972) for a theoretical exposition.

effect of customs union formation and it is still positive even if the countries are asymmetric. The investment relocation effect presents itself through the closing of all plants in A (that were present before the CU) and migration of all production to B after the CU. In other words, the number of plants in A drops from k_1^A to k_3^A under customs union.

Customs union is formed if both countries are better off compared to the outcomes from unilateral games. Suppose k_3^B and t^{CU} are the equilibrium number of firms investing and the tariff rate established under a customs union if the governments agree to it in the first stage. Country A's payoff under customs union is

$$U_3^A = \frac{1}{2}\left[X_3^A\right]^2 + t^{CU}\left[N - k_3^B\right]x_3^f$$

where $X_3^A = \frac{Na - k_3^B c^B - \left[N - k_3^B\right]\left[c^f + t^{CU}\right]}{N+1}$ is the total quantity consumed in A. We need to see if A can obtain a higher payoff by leaving the customs union and choosing a unilateral tariff. Suppose A implements a tariff of

$$t^* = \frac{k_3^B}{N}\left(c^B - c^f - t^{CU}\right) + t^{CU} \tag{11}$$

unilaterally on all imports regardless of the origin. Then all of the consumption in A comes from f since it is cheaper for all firms to supply the demand in A from plants in f. However, the total consumption and therefore, the consumer surplus stay the same. Under the new scheme, the tariff revenue is $t^* N x^*$ where $x^* = \frac{a - c^f - t^*}{N+1} > x_3^f$. When we substitute t^* from expression (11) into the new tariff revenue expression and rearrange it, we obtain $t^{CU}\left[N - k_3^B\right]x^* + k_3^B\left[c^B - c^f\right]x^*$ which is larger than the tariff revenue under the customs union. This implies A is able to choose a unilateral non-discriminatory tariff rate that keeps the consumer surplus unchanged while increasing the tariff revenue and the total payoff. Since this is not even the optimal policy in the unilateral game, the customs union can never lead to a higher payoff for A compared to the unilateral outcome. Thus A never agrees to the customs union.

We now summarize the equilibrium under the customs union:

Summary 2 *If the asymmetry between two countries $(c^A - c^B)$ is large enough, (i) all foreign firms invest in B under the customs union $k_3^B > k_3^A = 0$, (ii) more firms invest in the region, $k_3^B > k_1^B > k_1^A$ and (iii) total capital invested and production in the region increases. However, in the absence of any direct compensation from B, country A is worse off and does not agree to the customs union in the first stage.*

The asymmetry between the countries shifts all investment and production to B and this causes the payoff for A to go below its unilateral payoff. Another important result of the paper is that the *investment relocation* effect of a customs union dominates its *investment expansion* effect for A. This leads to the collapse of the customs union. The governments can solve this problem if direct transfers were available so that B could compensate A for its loss.

The CTC enters the picture to solve this problem since it operates as an indirect transfer mechanism. In essence the CTC requires all firms to balance their trades between the two countries although the actual rules are a little more complicated. Firms need to invest and produce in both countries if they want to sell their products with no tariffs in the other country. If the output of the plants in B cannot be sold in A, the benefits of the customs union for the firms disappear and investment expansion does not take place. We assume that this clause is a part of the customs union agreement signed in the first stage.

This is where different categories of automobiles become important. For simplicity, we suppose that there are two categories. We let i (j) denote the basic (luxury) category so that $c_i < c_j$ regardless of the production location. We also assume that the cost savings from producing i in B is higher compared to producing j:

$$c_i^A - c_i^B > c_j^A - c_j^B$$

We loosely interpret the CTC in this context as the requirement that each firm has to have one plant in each country. Under these circumstances, all firms choose to produce i in B and j in A. Suppose this was not the case and firm ZZZ located its plant for i in A and for j in B. Assuming the number of j plants in A and i plants in B are high enough, switching the location of these two plants of firm ZZZ has no first-order effect on the tariff rate in either category or the sales of other firms. However, the change in the profit level for this firm is

$$\begin{aligned} \Delta\Pi &= \pi_j^A - \pi_j^B + \pi_i^B - \pi_i^A \\ &= \left[c_j^B - c_j^A\right]\left[x_j^A + x_j^B\right] + \left[c_i^A - c_i^B\right]\left[x_i^A + x_i^B\right] > 0 \end{aligned}$$

This expression is positive since $\left[x_i^A + x_i^B\right] > \left[x_j^A + x_j^B\right]$ because of the cost parameters. Firm ZZZ benefits from switching its production locations and so do all other firms. Thus, if the fixed cost F is high enough for all models, all firms find it profitable to take advantage of the CTC rule and serve both markets from a single plant. Firms locate all plants for j (i) in A (B) in equilibrium. This rule eliminates the investment relocation effect of the customs union while maintaining the investment expansion effect. We now summarize the results:

Summary 3 *Suppose a customs union is formed between two asymmetric countries under the CTC where the fixed cost F is not too small and the cost differential $\left(c_i^A - c_j^A - c_i^B + c_j^B\right)$ is not too large. Then, (i) all luxury (basic) cars are produced in the higher (lower) cost country, (ii) more firms invest in the region and (iii) more production takes place in the region. Both governments are better off and thus agree to the customs union.*

As the Argentine Secretary of Industry declared, without a compensated trade clause there would be no more cars produced in Argentina under Mercosur. Furthermore, it was implicitly understood that there would be no Mercosur without this rule! Another confirmation about the importance of balanced investments comes from the auto lobby who has the most to gain from a customs union agreement. Perhaps the most vocal proponent for a compensated trade clause, former ADEFA president Horacio Losoviz wrote, "To produce or To Import, that is the question. We need to grow with Brazil, maintain the proportion of investment and production and the specialization in brands and types of vehicles" in the newsletter "Siglo XXI" (May 1999).

The compensated trade clause has another significant benefit for the auto companies other than solving the free rider problem. Before Mercosur, the main auto manufacturers in Argentina were the local subsidiaries of same multinational firms[22]. In other words, the companies who were to greatly benefit from Mercosur, who worked hard to save the sectoral agreement and who came up with the compensated trade clause had already existing plants in both countries. Their costs of enlarging their plant capacities are much lower than new entrants. If Mercosur is successfully established, then new firms only invest in Brazil. This has two negative consequences for the existing firms. First, it gives new firms an advantage over older firms since they have lower costs and second, it puts the future of Mercosur in danger if Brazilian production and exports were to eventually dominate the joint market. Thu, the existing firms were strongly in favor of such a rule since it provides higher entry costs for new firms (which need to operate some plants in Argentina) and guarantees the future of Mercosur.

It is a signal of the strength of the auto lobby in both countries that their members jointly formed the Automobile Commission to enforce the compensated trade clause. It has the authority to rule on the allowed exceptions from the compensation rule. The structure and rules of the commission make it sound like a cartel arrangement that would protect its market from new entries. The net effects of the commission are likely to become more apparent in the coming years and be the subject of another study.

[22] The only exception was GM who had no operations in Argentina at the time.

7 Conclusion

Our aim is to study the significant effects of the formation of customs unions on production location decisions of multinationals and FDI flows. Since a larger market can be served from a single plant and fixed operational costs can be lowered, total foreign investment and production (which the governments value) are likely to increase. We refer to this as the investment expansion effect. At the same time, some of the original investment and production is likely to be diverted to the lower-cost countries from higher-cost ones within the customs union. This investment relocation effect decreases the incentives for higher-cost countries to sign a customs union agreement.

We have provided an extensive discussion of the auto industry in Mercosur and of the sectoral agreements that govern this sector in the trade bloc as a case study of the above phenomenon. The most important impact of Mercosur on the auto sector is the growth in the FDI flowing into the region. This capital is used to build new plants (or to enlarge existing ones) to increase local production. Since Brazil has lower costs, it is economically efficient for foreign firms to establish their plants there in order to serve both markets. However, this prevents Argentina from agreeing to a customs union in the first place. Therefore it is necessary to direct some of the foreign investment to Argentina in the absence of direct compensation mechanisms. This creates a collective action problem among the auto firms since each one prefers to invest in Brazil. To solve this problem and to promote investments into Argentina, the auto companies themselves lobbied in favor of the compensated trade clause forcing all firms to establish plants in both countries. Furthermore, this rule benefits the incumbent firms at the expense of new entrants since it increases the cost of entry while sending a signal to the Argentine government that auto production and investment will continue. We concluded that, although it is economically inefficient, the compensated trade clause is strategically necessary for the establishment of free trade in automobiles and realization of the benefits from it for all parties.

There are many areas for future research on both the empirical and theoretical fronts. On the empirical front, further disaggregation of the data will permit an in-depth analysis of the trade flows in the sector at 4-digit SITC level. The extensive data-set collected can be used for an empirical estimation of trade relocation and/or suppression in the sector. On the theoretical front, the next topic is to analyze the model when a FDI-recipient country forms a customs union with the FDI-donor country such as Mexico and the United States in NAFTA.

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Table 1 - Mercosur Trade Performance

Year	Intra-Bloc Trade	% in World Trade
1990	4,127	1.10
1991	5,103	1.13
1992	7,214	1.20
1993	10,066	1.37
1994	12,048	1.47
1995	14,199	1.49
1996	17,077	1.47
1997	20,761	1.63
1998	20,429	1.63

Note: Intra-Bloc Trade is in US$ millions

Source: DOTS

Table 2- Auto Industry Performance (Finished Cars)

	Argentina			Brazil		
Year	Production	Exports	Exports /Production (%)	Production	Exports	Exports/ Prod
1985	137,675	774	0.56	966,708	207,640	21.47
1986	170,490	357	0.20	1,056,332	183,279	17.35
1987	193,315	460	0.23	920,071	345,555	37.55
1988	164,160	1,662	1.01	1,068,756	320,476	29.98
1989	127,823	1,841	1.44	1,013,252	253,720	25.04
1990	99,639	1,126	1.13	914,466	187,311	20.48
1991	138,958	5,205	3.74	960,219	193,148	20.11
1992	262,022	16,353	6.24	1,073,861	341,900	31.83
1993	342,344	29,976	8.75	1,391,435	331,522	23.82
1994	408,377	38,657	9.46	1,581,389	377,627	23.87
1995	285,435	51,550	18.06	1,629,008	263,044	16.14
1996	313,152	108,990	34.8	1,804,328	296,273	16.42
1997	446,045	210,386	47.16	2,069,703	416,872	20.14
1998	435,503	237,497	54.53	1,573,128	384,674	24.45

Note: The first two columns are in units.

Source: ADEFA, ANFAVEA

Table 3- Mercosur Auto and Related Industries Trade Performance

	Argentina					
Year	(1)	(2)	(3)	(4)	(5)	(6)
1985	88	36	7.69	40.89	16.30	
1986	107	37	5.05	34.52	13.66	
1987	117	36	6.39	30.76	17.66	
1988	137	35	4.97	25.48	12.42	
1989	184	57	4.65	30.86	20.33	
1990	162	53	3.83	32.66	24.31	
1991	240	112	6.99	46.49	37.95	2.83
1992	448	217	12.58	48.42	44.00	5.02
1993	744	503	18.53	67.35	36.92	7.05
1994	947	693	18.93	73.13	31.70	7.74
1995	1,339	1,097	19.62	81.94	35.03	12.20
1996	1,647	1,458	21.49	88.54	37.31	31.73
1997	2,882	2,538	31.29	88.07	39.77	38.30
1998	2,917	2,634	32.82	90.29	na	50.46

Sources: ADEFA, ANFAVEA, NBER, WTA

(1) Total Industry Exports, US$ Millions

(2) Industry Exports to Brazil, US$ Millions

(3) Auto Industry Exports to Brazil / Total Exports to Brazil (%)

(4) Auto Industry Exports to Brazil / Total Industry Exports (%)

(5) Auto Industry Imports from Brazil / Total Industry Imports (%)

(6) Exports To Brazil/ Total Production (%)

Table 4- Mercosur Auto and Related Industries Trade Performance

	Brazil					
Year	(1)	(2)	(3)	(4)	(5)	(6)
1985	1,581	37	6.87	2.34	12.77	
1986	1,477	44	6.54	2.98	6.88	
1987	2,441	63	7.61	2.58	6.26	
1988	2,551	25	2.62	0.98	7.03	
1989	2,545	42	5.90	1.65	10.10	
1990	1,892	60	9.33	3.17	7.94	
1991	1,910	259	17.59	13.56	14.24	
1992	3,010	913	30.05	30.33	20.81	
1993	2,658	897	24.54	33.75	24.30	
1994	2,684	1,041	25.18	38.78	18.78	16.87
1995	2,417	812	20.10	33.63	16.88	9.79
1996	3,012	1,279	24.74	42.47	30.68	11.02
1997	3,964	1,935	28.60	49.26	39.85	11.76
1998	4,263	2,042	30.27	47.90	na	13.91

Sources: ADEFA, ANFAVEA, NBER, WTA

(1) Total Industry Exports, US$ Millions,

(2) Industry Exports to Argentina, US$ Millions

(3) Industry Exports to Argentina / Total Exports to Argentina (%)

(4) Industry Exports to Argentina/ Total Industry Exports (%)

(5) Industry Imports from Argentina / Total Industry Imports (%)

(6) Exports to Argentina / Production (%)

Table 5 - Investment in the Automobile Industry ($ millions)

Year	Argentina	Brazil
1990		789
1991		880
1992		908
1993		885
1994		1,195
1995	avg 90-95: 360	1,693
1996	1,534	2,359
1997	1,941	2,092
1998	1,667	2,335
1999	370	na

Sources: ADEFA, ANFAVEA

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